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OCCUPATIONAL EDUCATION AND TRAINING FOR TOMORROW'S WORLD OF WORK. NUMBER 5, UNIVERSITY PROGRAMS.

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UNIVERSITY PROGRAMS OF AN OCCUPATIONAL NATURE MAY BE CLASSED AS FULL OR PART COLLEGIATE PROGRAMS, NONCOLLEGIATE SHORT COURSES, SPECIALIZED SHORT COURSES, CONFERENCES, OR EXTENSION COURSES. THE COLLEGIATE PROGRAMS ARE USUALLY 2 YEARS IN LENGTH AND ARE DESIGNED FOR STUDENTS WHO DO NOT HAVE THE TIME, FINANCES, OR DESIRE TO COMPLETE A 4-YEAR PROGRAM. NONCOLLEGIATE SHORT COURSES RANGE IN LENGTH FROM 2 TO LESS THAN 1 YEAR AND A SEQUENCE OF INSTRUCTION FOR SPECIFIC TYPES OF WORK. SPECIALIZED SHORT COURSES ARE USUALLY FOR UPGRADING PURPOSES. CONFERENCES ARE DESIGNED TO PROVIDE CONTINUING EDUCATION FOR GROUPS OF PEOPLE WHO ARE GENERALLY EMPLOYED IN A RELATED FIELD. EXTENSION COURSES ARE ORGANIZED BY LAND-GRANT COLLEGES AND UNIVERSITIES THROUGH THEIR COOPERATIVE EXTENSION SERVICES TO PROVIDE INFORMATION AND TRAINING WHICH MAY LEAD TO BETTER OCCUPATIONAL ADJUSTMENT. THE FOLLOWING CHARACTERIZE THESE PROGRAMS -- (1) THE LONGER PROGRAMS ISSUE CERTIFICATES OR DEGREES UPON COMPLETION, (2) STUDENTS TEND TO BE IN THEIR LATE 20'S, (3) THE COURSES ARE PROBABLY OFFERED AT A BRANCH, (4) ENTRANCE REQUIREMENTS ARE SIMILAR TO 4-YEAR COLLEGE PROGRAMS, (5) EXISTING FACILITIES ARE OFTEN USED, (6) COURSES MAY BE COSTLY TO STUDENTS, (7) THE TEACHERS HAVE COLLEGE DEGREES, AND (8) PROGRAMS CAN BE FLEXIBLE BUT CHANGES REQUIRE ABOUT 2 YEARS. OTHER ALTERNATIVES FOR VOCATIONAL TRAINING ARE DISCUSSED IN VT 001 353 - VT 001 356 AND VT 001 358. (EM)

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OCCUPATIONAL EDUCATION AND TRAINING FOR TOMORROW'S WORLD OF WORK

NO. 5 UNIVERSITY PROGRAMS

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KNOWLEDGE TODAY is rapidly being increased. In response the universities are broadening their curricula. This broadening however, is not only in the direction of developing educational and training programs to meet the increasing demands for greater mental skills but for manual skills as well.

There has been little question — in fact, it has generally been expected — that universities would provide the education and training for occupations requiring high levels of mental skill, but their role in providing the training for manually skilled occupations has not been as clearly defined. Nevertheless, more programs designed to provide this type of training are being initiated principally at university regional campuses.

Mental vs Manual Skills

Modern industrial employment demands a wide variety of skills. Jobs range from those demanding mental skills almost exclusively to those with a major emphasis upon manual dexterity. See Fig. 1 on page 2.

A professional engineer, as observed in the chart below, requires a high development of mental skill. He must be able to visualize how new knowledge, uncovered by the pure scientist, may be put to practical use. Most engineers do not need to be skilled in the use of manual tools.

The engineering technician, located further to the left in the chart, requires some of the knowledge and skills of the professional engineer but also some of the physical skills of the mechanic and craftsman. He must possess some understanding of theory and methods but must be able to apply it for solving the complex problems of modern industry. He usually specializes in one aspect of engineering.

The mechanic or skilled craftsman is located still further to the left in that he brings into being the ideas as conceived by the engineer and detailed by the technician. It is the toolmaker, for example, that makes the jig or die which originates in the mind of the engineer and is refined by the technician. The major skill of the vast majority of craftsmen is manual dexterity in the use of specific tools.

In addition to providing a rough guide as to relative proportions of manual and mental training, the chart also gives some indication of the educational levels required for the various occupational classifications.

University Programs

Universities have devoted a large share of their efforts and resources to the education of people for occupations classified as professional in the chart. However, programs have also been developed which may appropriately be classified under the heading of post-high school occupational training. These may be classified as follows:

Collegiate or part collegiate programs
Non-collegiate short courses
Specialized short courses
Conferences
Extension

Collegiate or Part Collegiate Programs

These are programs usually two years in length, designed to provide training for students who do not have the finances, time or desire to complete a four-year college program. Students take regular college courses. The credits earned can usually be easily transferred to a four-year program if the student so desires. Students completing these programs secure jobs in farming, ranching or other farm related occupations, nursing, drafting, surveying, etc. The entrance requirements for these programs are much the same as those for the four-year college student.

Non-Collegiate Short Courses

These programs range in length from two to less than one year and involve a sequence of organized classroom instruction covering more than one subject matter field.

In many cases, representatives of industry work closely with the interested departments of the university to develop curricula that provide the kind of training industrial leaders consider essential for the specific types of work for which the student is being trained. In some cases, on-the-job training at the business firm itself comprises part of the training program.

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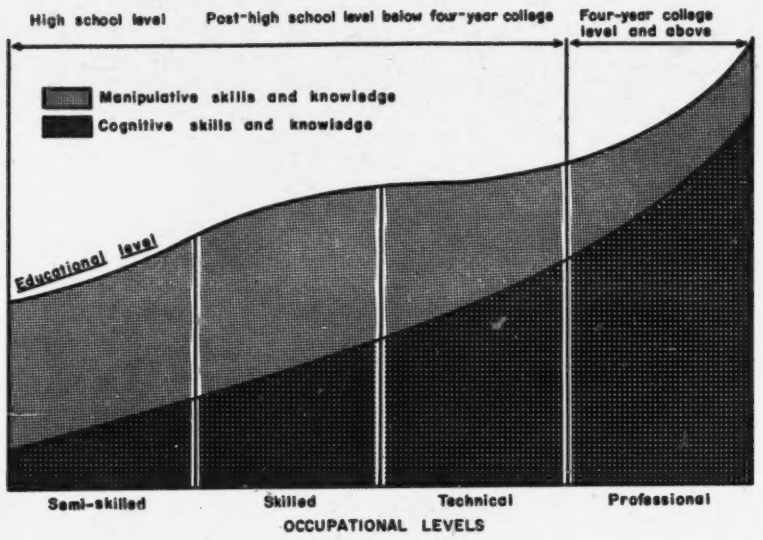

Fig. 1 — Relative proportions of manipulative (mechanical, manual, opertional) and cognitive (understanding of principles, relationships, theory, etc.) in educational programs for different occupational levels.

The types of jobs available to students after completion of the training period include farming, herd management, mechanics, partsmen, sales, bookkeeping, food industry and restaurant, architect assistants, mechanical engineering assistants, shop foremen, etc. Admission to these types of programs range from only an interest on the part of the student to high school graduation.

Specialized Short Courses

The basic purpose of these courses is to provide intensive, specialized training in order to increase the proficiency of people in their present employment or to prepare them for employment in a specific field. In agriculture, courses offered would include dairy manufacturing, turf management, artificial breeding, timber management, welding, etc. These courses range from 1 to 12 weeks in length, and admission requirements vary from "none" to a high school diploma.

Conferences

The objective of these programs is to provide continuing educational opportunities for groups of people. A particular group interested in a specific problem meets with representatives from the university for usually a two- or three-day period of intensive study. These conferences have covered many diverse interests such as livestock health, law enforcement, and cooperative management.

Admission requirements generally are only "interest in the subject matter". Most conference participants are employed in an occupation related to the course of study.

Cooperative Extension Service

A wide range of educational programs is offered by the land-grant colleges and universities through their Cooperative Extension Services. Many of these programs provide information and training which may lead to better occupational adjustment for those who participate. Some examples are: career exploration for 4-H and YMW (older youth) groups; farm production, management and marketing; and home economics. Programs may be as specific as sheep-shearing or fruit tree pruning or as broad as human resource development.

Nature of Programs

The nature of post-high school programs can be illustrated by the associate degree, certificate, and special service programs offered by many universities and schools.

Associate Degree Program

This is a program of from two to four years in length to train highly qualified technicians. Its content is more applied than that designed to prepare students for professional occupations, but high school graduation and a demonstration of a high level of intellectual capacity are prerequisites for entrance. Entrance requirements are virtually the same as those of the university's regular four-year program.

A typical two-year curriculum for applied technology, for example, requires about 64 semester hours of university credit courses. These hours are distributed about as follows:

SUBJECT AREA	SEMESTER HOURS
1. Mathematics	5
2. Physics	8
3. English and speech	9
4. Specified nontechnical courses	6
5. Specified applied science and technology courses	22
6. Specified or elective applied science, technology, or nontechnical courses	14

The mathematics and physics provide the student with a knowledge of basic theory and methods; English and speech increase his ability to communicate both by the written word and verbally with his fellow workers; the non-technical courses improve his ability to "get along" with other workers and to become a better citizen; and the technical courses prepare him to perform the technical tasks required by his area of specialization.

The students enrolled in a two-year technical program tend to be, on the average, only slightly older than university freshmen and sophomores.

Approximately two-thirds of the student's time is spent in the classroom acquiring mental skills; the other third he will spend in laboratory work improving his manual skills.

Certificate Programs

These programs have been designed primarily for adults who wish to acquire or upgrade their technical skills. They are designed to be as concentrated and immediately practical as possible for students who have limited time or funds for formal education.

The curricula for these adult programs contain less than 40 semester hours. The orientation of these programs is toward the students' specific needs. Most liberal arts courses found in the two-year technician's program have been removed. Only one or two theory and methods courses of the two-year program are included. Most of the courses in the curricula teach and train the student how to do certain specialized tasks.

Although a high school education may not be required for admission into the program, counselors carefully screen students to determine if they are capable of doing the work.

Approximately one-half of the student's time is spent in the classroom, the other half in the laboratory.

The average age of students in the adult program is 25 to 30. This is higher than the average for the student in the two-year technician's program.

"Regional Campuses"

The wide range of programs developed by the universities is an outgrowth of the land-grant philosophy of providing for

the needs of the people. However, in addition to the creation of specific programs to meet these needs, it has been deemed essential that they be made more readily available to the people. In response the university has developed the regional campus.

Origin and Purpose

The branch campus is a relatively recent and fast growing development. Twenty years ago they were virtually non-existant.

Initially the service commitment was met through "extension" programs in which faculty members were sent out into the state to conduct short courses, lecture series, and seminars wherever and whenever the people's needs could be met. These were primarily adult non-credit programs.

Later during the Depression of the 1930's in order to provide low-cost college education to "regular" students some state universities secured buildings in population centers away from the main campus on a temporary basis. However, after economic conditions improved, the universities rapidly increased such centers. The most recent count reveals that there are approximately 58 state and land-grant universities operating 256 regional campuses.

Types of Campuses

To classify each campus according to the type of program it offers is very difficult because of the wide diversity. Each campus has tended to develop programs to satisfy the specific educational and training needs of the community in which it has been located. However, the National Association of State Universities and Land-Grant Colleges has developed a three-fold classification: undergraduate, technical institute, and extension centers. By mid-1964, the Association estimated there were 109 undergraduate campuses, 34 technical institutes, and 117 extension centers. (See list of those in the North Central Region on page 4.)

The primary function of the undergraduate campus is to offer one or two years of a regular four-year baccalaureate program to full-time students. This work has the same status as that completed at the main campus.

The extension center offers both credit and non-credit courses to part-time students who are usually older than the average college or university student.

Technical institutes are organized and operated to train students for the broad range of technical occupations.

Important Considerations

As the universities, primarily through their regional campuses, provide more manual skills training, it is important to assess the impact upon existing facilities, needs for additional facilities, administration costs, procurement of teachers, effectiveness in meeting the training needs of the local people.

More Effective Use of Existing Buildings

An expansion of program would likely increase the number of students at the regional campuses which in turn would increase the use of their existing buildings. This would reduce the costs of such facilities per student. Such an increase in efficiency may possibly permit the establishment of campuses in locations which otherwise would not be considered feasible.

Large Increases of Expensive Equipment

Manual skills can only be obtained through repetitious practice. It is virtually impossible to train people as drill press operators, engine lathe operators, and milling machine operators unless they can work with modern up-to-date lathes, grinding machines, drilling machines, and milling machines. The more a regional campus moves in the direction of manual skill training, the more time the student would need to spend with machines. The more time the student spent on machines, the greater would be the need for additional machinery per student.

More Efficient Use of Top Administrative Personnel

The university and its regional campuses already have administrative staffs for hiring teachers. These same administrators could hire additional people needed to effect changes in the scope of a center's training program. Under this arrangement the administrative costs per student trained would be less than other alternatives in which an administrative staff is not already in existence.

Not All People Can Enter

A student is usually admitted to the university as a regular student only if he is a high school graduate and has completed certain prescribed units of high school work. Preference is also given to applicants with more than the minimum level of the prescribed units. Most universities require the College Board Scholastic Aptitude Test (SAT). Some universities will not admit those who rank low in their high school graduating class unless they do exceptionally well on the College Board Test.

Only regular students are permitted to enter the two-year technical programs.

The entrance requirements for the adult technical continuing education program, on the other hand, are not as high. A person will be permitted to enter the program without a high school diploma but only after he has convinced a counselor that he is capable of doing the work. He is classified as a temporary student.

More Flexibility for Student's Program

A student who had not graduated from high school could enroll at a center as a temporary student under a certificate program in applied technology. After demonstrating the aptitude he would be permitted, if he so desired, to shift into the associate degree program, and possibly into a full professional four-year baccalaureate program. The possibilities of such advancement would have been more limited had his initial training not been under the direct supervision of teachers at the regional campus.

Greater Job Opportunity

The adult trained at the university's technical institute usually takes courses in theory and methods. These foundation courses are not only likely to help him better perform the tasks of the particular position for which he is attempting to qualify, but also for other jobs that are closely related. If after completing the training period the student is unable to locate a job or, if while on the job he is replaced by a machine, it may be much easier for him to find other employment than the person whose training has only prepared him to perform a specific manual task.

Courses are Costly to Students

An associate degree applied technology program usually lasts two years. This can be very costly to the person who needs a job in a hurry. Furthermore, students are usually required to pay tuition and other fees. These opportunity and out-of-pocket costs can place this type of program beyond the reach of unemployed men with families who need income immediately.

The certificate program of less than 40 semester hours can be completed by the average part-time student in about three years. The person, however, who does not have a job nor the skills at present to obtain one, needs to be taught a very specific elementary skill as soon as possible. The types of courses offered by the university's technical institutes and the fact that the student must pay fees for such training may explain, in large part, why a high proportion of the students in the adult technical programs are already employed and attending classes on a part-time basis.

Teachers Must Have College Degree

More and more the advanced degree is required for university employment. These degrees, for the most part, reflect academic achievement. Yet few highly manually skilled people hold such degrees. If the regional campus is to develop an effective manually skilled program, these people must be made a part of the university's staff.

The lack of academic degree by these people is not the only potential source of difficulty. University administrators may be forced to pay salaries as great or greater than those received by the academic staff in order to entice these skilled artisans from industrial employment.

Even if a Bachelor's or Master's degree were set as a minimum and such people were hired, the tendency is for promotions to be given to the Ph.D. with the national reputation who has "made a contribution to his profession". There is a very strong tendency to treat the applied teaching staff as second class citizens.

Flexibility of the Program

Industry and people are on the move. Nine percent of the United States 1960 population had lived in a different state in 1955. Consideration must therefore be given to the kinds of employment and their training needs on a much broader basis than simply that of the local community. The cosmopolitan nature of most universities would permit them to view the total employment needs situation. In addition, university people can be and are in relatively close contact with industrial people.

On the other hand, although the university may be quick to recognize a need for adjustment, sometimes the procedure for getting a curriculum change usually begins a year or two before it will appear in the catalogue.

University Regional Campuses

ILLINOIS

Southern Illinois University — Undergraduate campus at Edwardsville; Technical Institute at Southern Acres.

University of Illinois — Undergraduate campus at Chicago.

INDIANA

Purdue University — Undergraduate campuses and Technical Institutes at Fort Wayne, Hammond, Indianapolis, and Michigan City.

Indiana University — Undergraduate campuses at East Chicago (Calumet), Fort Wayne, Gary, Indianapolis, Jefferson-New Albany, Kokomo, and South Bend.

IOWA

Iowa State University — Technical Institute at Ames.

MICHIGAN

University of Michigan — Undergraduate campuses at Flint and Dearborn; Extension Centers at Battle Creek, Dearborn*, Detroit*, Escanaba, Flint*, Grand Rapids*, Port Huron, Saginaw*, and Traverse City.

Michigan State University — Off campus centers at Benton Harbor*, Grand Rapids*, Marquette*, Pontiac*, Saginaw*, Traverse City*, and East Lansing*.

MINNESOTA

University of Minnesota — Extension Centers at Duluth, Minneapolis, Morris, Robbinsdale and St. Paul.

MISSOURI

University of Missouri — Undergraduate campus at Normandy.

NORTH DAKOTA

University of North Dakota — Extension Center at Williston.

North Dakota State University — Undergraduate campuses at Bottineau and Wahpeton*.

OHIO

Bowling Green — Undergraduate campuses at Bryan, Fostoria, Fremont and Sandusky.

Central State College — Undergraduate campus at Wilberforce.

Kent State University — Undergraduate campuses at Ashtabula, Canton and Cleveland; Technical Institutes at Bedford, Elyria, Euclid, Orville, Salem, Tuscarawas, Wadsworth and Warren.

Miami University — Undergraduate campuses at Dayton (with Ohio State Univ.) Hamilton, Middletown, Norwood and Piqua.

Ohio State University — Undergraduate campuses at Dayton (with Miami University), Lakewood, Lima, Mansfield, Marion and Newark; Extension Centers at Cincinnati Graduate Center (social work) and Wright-Patterson AF Base.

Ohio University — Undergraduate campuses at Blytheville AF Base, Arkansas; Chillicothe, Ironton, Lancaster, Lockbourne AF Base, Martin's Ferry, Portsmouth and Zanesville.

WISCONSIN

University of Wisconsin — Undergraduate campuses at Green Bay, Kenosha, Manitowoc, Marshfield, Marinette, Menasha, Milwaukee, Racine, Sheboygan and Wausau.

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* *Also a Graduate Center.*

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